

Response to Notice ... dated April 28, 2006

Reply to Notice of Non-Compliant Amendment dated April 24, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of Claims:

1. (Currently Amended) A probe for scanning probe lithography, comprising:

a lever spring, at one end of which a supporting part is fabricated, and
at the other end of which a tip part is fabricated;

a conductive layer which is fabricated on one side of said lever spring
and said tip part; and

a conductive fine needle which is fabricated at the apex of said tip part
and is surrounded by an insulator, wherein one end of said fine needle is connected
to said conductive layer and the other end of said fine needle is not covered with said
insulator;

wherein the cross-sectional diameter of said conductive fine needle is
substantially uniform along the axial direction, and the cross-sectional diameter of
said insulator surrounding said conductive fine needle increases in size in a direction
extending away from said other end of said fine needle-a tip part, and a spring
section,

wherein said tip part is so structured that a part of a conductor thereof
is covered with an insulator, and

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~~wherein said conductor is so formed as to have a substantially uniform cross-sectional configuration perpendicular to a surface to be patterned through scanning.~~

2. (Currently Amended) A probe for scanning probe lithography as claimed in claim 1,

wherein said tip part including said fine needleconductor and said insulator is formed in a quadrangular pyramid shape having a flat apex ~~at which an apex of said conductor is exposed.~~

3. (Currently Amended) A probe for scanning probe lithography as claimed in claim 1,

wherein said tip part including said fine needleconductor and said insulator is formed in a hemispherical shape ~~with an end of said conductor exposed at the zenithal point thereof.~~

4-5. (Canceled)

6. (Currently Amended) A probe for scanning probe lithography as claimed in claim 1,

wherein said shaft conductor is made of a hard conductive material selected from the group consisting of titanium, tungsten, molybdenum, titanium

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carbide, tungsten carbide, molybdenum carbide, graphite, conductive diamond,
hydrogenated carbon, titanium nitride, tungsten nitride, molybdenum nitride, and
carbon nanotube.

7. (Original) A probe for lithographic scanning probe as claimed in claim 1,
wherein said insulator is made of a hard insulating material selected from the
group consisting of silicon dioxide, silicon nitride, and diamond.

8. (Canceled)

9. (Currently Amended) A probe of scanning probe lithography as claimed in
claim 1,

wherein said lever spring is formed to section is of a cantilever type or
of a double-end-support type, and at both ends of which supporting parts are
fabricated, and at the center of which a tip part is fabricated.

10. (Currently Amended) A method of making a probe for scanning probe
lithography, comprising the steps of:

a lever spring, at one end of which a supporting part is fabricated, and
at the other end of which a tip part is fabricated;
a conductive layer which is fabricated on one side of said lever spring
and said tip part;

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a bending-correction layer having a predetermined thickness on said conductive layer; and

a conductive fine needle which is fabricated at the apex of said tip part and is surrounded by an insulator, wherein one end of said fine needle is connected to said conductive layer and the other end of said fine needle is not covered with said insulator;

wherein the cross section of said fine needle has effectively the same diameter along the axial direction, and the cross section of said insulator increases in size in the direction of said lever spring,

wherein said probe is fabricated by the following steps of:

preparing a silicon substrate having a predetermined crystal orientation, and opening a predetermined hole therein;

forming an insulator silicon nitride layer having a predetermined thickness on said substrate;

opening, at the center of a hole shape arranged on said silicon nitride insulator layer, a pit having a predetermined configuration which extends from the surface of said insulator layer to said silicon substrate;

forming a conductive layer having a predetermined thickness on said insulator silicon nitride layer, and forming said conductive fine needle in said tip;

forming a bending-correction layer having a predetermined thickness on said conductive layer;

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carrying out, after formation of said vending-correction layer,
configuration processing of a said lever spring section which is formed of said silicon
~~nitride layer substrate, and which is formed of said insulator layer, said conductive~~
~~layer, and said vending-correction layer on said silicon substrate, and configuration~~
~~processing of a holder joint part and said tip part;~~

~~forming said spring section into a predetermined cantilever shape~~
supporting part on said lever spring at the other end of the tip part; and
~~forming a holder at the base of said cantilever shape; and~~
~~removing said silicon substrate from said silicon nitride layer lever~~
spring.

11. (New) A probe for scanning probe lithography, comprising:

a lever spring, at one end of which a supporting part is fabricated, and
at other end of which a tip part is fabricated;
a conductive layer which is fabricated on one side of said lever spring
and said tip part; and

a conductive fine needle which is fabricated at the apex of said tip part
and is surrounded by an insulator, wherein one end of said fine needle is connected
to said conductive layer and the other end of said fine needle is not covered with said
insulator;

wherein the cross section of said fine needle has effectively the same diameter along the axial direction, and the cross section of said insulator increases in size towards the direction of said lever spring,

wherein said probe is fabricated by the following steps of:

preparing a silicon substrate having a predetermined crystal orientation, and opening a predetermined hole therein;

forming a conductive hydrogenated carbon film having a predetermined thickness on said substrate;

forming a hard-mask layer on the conductive carbon hydride film and removing the hard-mask layer except the center part of said hole portion, the diameter of which is approximately the same as the diameter of said fine needle;

irradiating an X-ray beam to the conductive carbon hydride film from above the substrate so that the conductive carbon hydride film is changed to an insulating diamond layer except said center part;

removing the hard-mask layer of the center part;

forming a conductive layer having a predetermined thickness on the insulating diamond layer and the conductive carbon hydride film of the center part;

carrying out configuration processing of said lever spring which is formed on said silicon substrate, and which is formed on said insulator, insulating diamond, said conductive layer, and said tip part;

forming said supporting part on said lever spring at the other end of the tip part; and

removing said silicon substrate from said lever spring.

12. (New) A probe for scanning probe lithography, comprising:

a lever spring, at one end of which a supporting part is fabricated, and
at the other end of which a tip part is fabricated;

a conductive layer which is fabricated on one side of said lever spring
and said tip part; and

a conductive fine thin plate which is fabricated at said tip part and is put
between insulators, wherein one end of said fine thin plate is connected to said
conductive layer and the other end of said thin plate is not covered with said
insulator;

wherein the cross section of said thin plate has substantially the same
width in the direction of said lever spring, and the cross section of said insulator
increases in size towards the direction of said lever spring.

13. (New) A probe for scanning probe lithography as claimed in claim 12,

wherein a plurality of said conductive fine thin plates are fabricated and
each of which is isolated by insulator layers and said conductive layer are also
separated by insulator layers according to said conductive fine thin plates.

14. (New) A probe for scanning probe lithography as claimed in claim 1,

wherein said conductor is made of a hard conductive material selected from the group consisting of conductive diamond and chromium.